# GEOGRAPHIC NEWS BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

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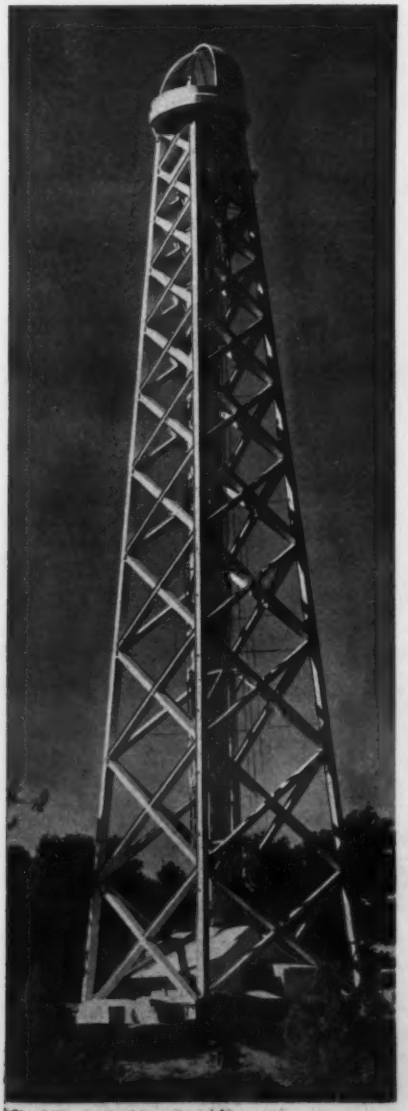

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TOWER TELESCOPE USED AT MT. WILSON TO STUDY THE SUN

With this 150-foot tower and a 75-foot well beneath, the sunspots and the great flames, or prominences, on the edge of the sun are made to tell their story (see Bulletin No. 1).

CONTENTS FOR WEEK OF APRIL 27, 1925. Vol. IV. No. 8.

1. Expedition to Measure Sunbeam's Heat.
2. Frankfort: Another Center of Jewish Interest.
3. How Los Angeles Goes East for Water.
4. Manganese: First Lieutenant to Steel.
5. Douarnenez: Port of Fish and Independence.

HOW TO OBTAIN THE BULLETIN

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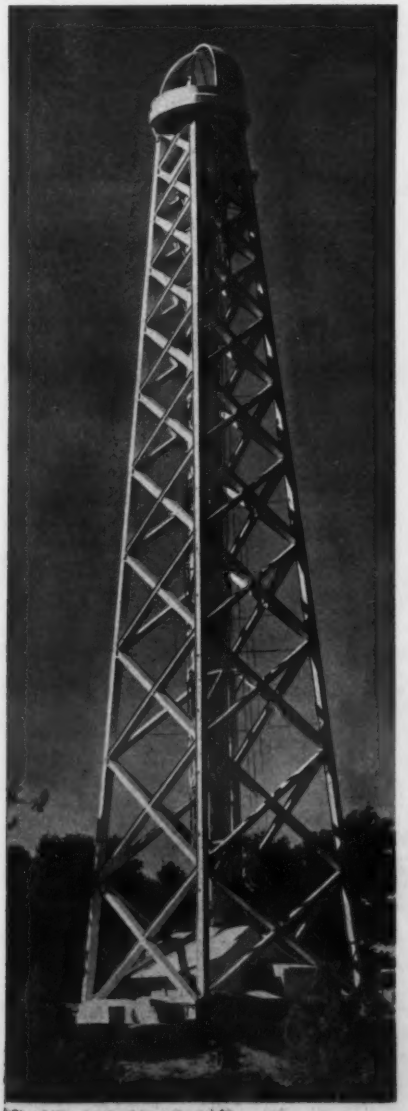

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## Expedition to Measure Sunbeam's Heat

THE National Geographic Society has announced that it will send, in cooperation with the Smithsonian Institution, an expedition half way around the world for a remarkable purpose—to make a daily measure of the heat of the sun.

To the layman such an inquiry appears an ultra-refinement of scientific research, but, should the joint expedition work out the findings it hopes for from its studies, all civilized mankind will benefit by the results.

The observations will extend over four years. They will be made to determine a method of long-range weather forecasting by which it is hoped a cyclone across the Middle West, storms at sea, a week of rainless days for a county fair, or the last frost of spring can be predicted well in advance.

### Will Be in Field Four Years

The expedition will be known as "The National Geographic Society's Solar Radiation Expedition, in cooperation with the Smithsonian Institution," according to the announcement of Dr. Gilbert Grosvenor, president of the society, and its purpose, as officially defined, is "to carry on for four years daily observations of the solar constant of radiation, in a manner suitable to measure the variation of the sun."

Dr. Charles G. Abbot, director of the Smithsonian Institution's Astrophysical Observatory, who has been called the Isaac Newton of the laws of the sun, will be the expedition leader.

The work of solar observation has been carried on by Dr. Abbot and his associates at the Smithsonian's Astrophysical Observatory since 1902. At first observations were made for a part of each year at Mount Wilson, California. In 1918 a station was established in the nitrate desert of Chile and, two years later, a station was set up on Mount Harqua Hala, in Arizona, which took over the work previously done at Mount Wilson. The new station will add to the value of the work of the two stations already established.

The principle underlying the investigations is that the sun sheds its life-giving heat equally on every square inch of the outer surface of our planet exposed to it—only the outer surface in this case is the surface of the ocean of air in which we live, and not the surface of the earth on which we move.

### To Reach "Roof of the Air"

The solar geographer's task would be easy if men, like fish, could arise to the surface of their air ocean. Since man cannot do that, he must devise ways to overcome the interference of vapors and dust particles that affect a sunbeam the instant it strikes the outer rim of our air envelope.

It is to discount this interference that Dr. Abbot has spent decades in devising unique instruments, which the expedition will use, and in perfecting others which the late Samuel Pierpont Langley invented. It was recalled that an early impetus was given to the study of solar radiation by a former president of the National Geographic Society, Dr. Alexander Graham Bell, when, in 1892, he contributed $5,000 to the Astrophysical Observatory of the Smithsonian Institution to start studying solar radiation. The National Geographic Society has set aside $55,000 to be expended in the four years' study which may bring the dream of long-range weather forecasting to a practical realization.



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**VIEW OF SECTION OF AN INVERTED SIPHON ON THE OWENS VALLEY PROJECT**

**One of the unique features of the 250-mile aqueduct which supplies Los Angeles with water, is the inverted siphon across Whitney Canyon. This carries the water down one side of a ridge and up the other. Los Angeles bought land and erected a plant for the production of cement to go into the conduits and canals of this project. So great has been the growth of the city that this system is becoming inadequate, making necessary a still greater feat of engineering to bring more water to the coast (see Bulletin No. 3).**

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## Frankfort: Another Center of Jewish Interest

CEREMONIES of laying the corner-stone of a Hebrew university which will overlook Jerusalem reflects attention on another city which is also a center of interest for all the sons and daughters of the Tribes of Israel. Frankfort-on-the-Main in Germany owns a Museum of Jewish Antiquities which has been established in the old home of the Rothschilds, the famous banking family.

It is upon the financial strength of Frankfort that its important commercial standing among the cities of the European Continent rests, rather than upon its manufactures and other industries, though it has these in abundance. Since the days of old Mayer Anselm, the first of the Rothschilds who won fame as a financier and sent out his five sons to corner the money markets of other European countries, Frankfort has been the home of some of the strongest moneyed institutions in the world.

### Ancient "Ford of the Franks"

Frankfort, now the size of Milwaukee, Wisconsin, or Washington, D. C., was the old Trajectum Francorum or "Ford of the Franks," of early Roman days, which Charlemagne selected as the place for the convocation of bishops and nobles. Its position in a fertile and picturesque plain surrounded by mountains has been one of the chief factors contributing to its long career of almost uninterrupted prosperity.

During the days of Mayer Anselm, Frankfort, like most European cities, had a Jewish quarter known as the Judengasse, the gates of which were closed at night to prevent the inhabitants from going out of their portion of the city until morning. These gates were torn down during the French occupation of the city during 1806. By degrees almost all the old houses in the Ghetto have been torn down, with the exception of Number 148 in the street now known as the Bornestrasse, the ancestral home of the Rothschilds, which has been restored to its former condition. This is the building which is to house the valuable collection of antiquities representing all periods of Jewish history from the Diaspora, or the dispersion of the Jews after the Babylonian captivity.

### A Safe Deposit Vault of History

Many a famous man has left an heritage of history and romance to the city. Charlemagne built one of his favorite palaces there; in the thirteenth century the city became one of the notable free cities of the continent and so remained until 1866 when, after having sided with Austria in the war with Germany, it was formally incorporated in the Prussian State.

From the days of Frederick Barbarossa, who was the first reigning German king to be chosen in the city, it became customary to elect the German rulers there, and in 1356 Charles IV made this custom a right. The Golden Bull, in which the provision is made, is still in the Archives of the Romer, or City Hall, where it may be seen to-day almost in its original state of preservation.

No other native of Frankfort holds as high a place in the hearts of so many people as Goethe. At Number 23, Grosser Hirschgraben, stands the Goethe House, where the poet spent his boyhood. It has been carefully preserved and



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## Weather Depends on Sun

The layman usually is astounded when told that all our weather—the rains and the snows, the storms and the droughts—have their origin in the slight variation of heat we get from the sun. This variation over short periods is only 3 or 4 per cent; in the twenty years of Dr. Abbot's study its outside limits have only been between 10 and 11 per cent.

The highly complex effects of this variation in different localities is the result of the earth's variegated geography. Air, like humans, is responsive to the company it keeps, and a change of heat imparted affects very differently the air over mountains, deserts, oceans, and plateaus. Whereupon the extremely fluid atmosphere seeks to readjust itself—and the various kinds of "weather" ensue.

In passing, it should be noted that it is not merely temperatures of the sun rays that are to be taken, but the heat, which implies energy, so that the measure is in terms of calories—the standard adopted being a given number of "calories per square centimeter per minute."

This means that if you had a cube of water the size of dice, and this water were blackened so it would absorb heat, and if you could carry it outside the atmosphere so the sun's rays could strike it "head on," those rays would warm it 2 degrees per minute.

## Special Instruments Are Necessary

The first instrument devised to "take the pulse" of a sunbeam is a comparatively simple mechanism with a long name—the pyrheliometer. A long tube catches the sun's rays and projects them upon a blackened silver disk, which is connected with a thermometer. Obviously, this instrument registers the sunbeam, not as it left the sun, but as it reaches the observer after its drive through the air has distorted it.

To discount this distortion, advantage is taken of the fact that different parts, or wave lengths, of a light ray are affected in different degrees by the obstructions they meet. An instrument of extreme delicacy has been devised to assess the intensity of each part of the spectrum—an instrument called the bolometer, which registers a temperature change down to one-millionth of a degree!

## A Unique "Adding Machine"

Five such measurements are made in a forenoon; as the rays grow intenser as they approach the vertical, and by a system of elaborate comparisons and calculations the effects of the air on the rays can be overcome.

A casual visitor to the station may conclude that the explorers have taken along a xylophone for their musical needs. A closer examination will show that the odd-looking contraption is an extrapolator, which is a combination of eight slide rules. Formerly it took thirty hours to compute one solar observation. Now five observations can be computed in less than four hours—so that the result of the morning's work can be wired out by night.

Dr. Abbot will inspect sites in Baluchistan, Southwest Africa and Morocco before deciding upon the location of the expedition's field station.

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## How Los Angeles Goes East for Water

LOS ANGELES may accomplish more wonders in the name of water. A 13-mile tunnel through a mountain is planned to link up the project for providing water from the Colorado River for Los Angeles. This proposed new system will supplement the 250-mile conduit which now brings water from Owens Valley.

Not even the greater difficulties of the new project can obscure the dramatic interest that accompanied the building of the Owens Valley conduit and the conquering of the desert for the first time.

Even the engineering adventures of the old Romans in bringing the water supplies for their cities in great arched canals was surpassed in the construction of the huge conduit that snakes its way for 250 miles to divert a river across the desert, through mountains and over and under canyons that the residents of a great city in a land of little rainfall might have water.

### A River That Did Not Reach the Sea

In 1905, when Los Angeles found it necessary to go far afield for an increased water supply, most of the Owens River, hidden away behind mountains and deserts, was going to waste into Owens Lake, a salt-water depression, from which it was lost by evaporation. The water rights of many of the ranchers who lived in the valley were bought up by the city. Later the watershed of the river in the high Sierras was set aside by the Federal Government as a forest reservation.

More than $20,000,000 was spent by the city on its aqueduct and an army of 5,000 men was kept busy. Construction started in November, 1908, and water was delivered to the city from the completed aqueduct within four years. In order to bring the new supply from its far-away source the city's engineers had bored 43 miles of tunnels, and had built 15 miles of steel siphons and concrete flumes, 22 miles of canal and 137 miles of concrete-covered conduit.

### Fed by Snow-clad Sierras

The Owens Valley, from which Los Angeles' water starts on its long trans-desert journey, is a narrow cleft in the Sierras. Seven miles will span it at almost any point. To the eastward are the brown Inyos, to the westward the white Sierra. This latter range of mountains forms the roof-tree of the United States. Mount Whitney, snow-clad monarch of them all, rises to a height of 14,502 feet. Twenty-three other peaks exceed 13,500 feet in elevation.

Along the Sierra the snows lie deep through the year. From the base 35 streams debouch and pour into Owens River from a drainage area of 2,800 square miles. To insure a water free from alkali, Los Angeles went 35 miles above the mouth of the river to build the intake of the aqueduct. The first 22 miles, from the intake to the toe of the Alabama foothills, is in the form of a canal 50 feet wide and 10 feet deep, uncemented and at a slightly higher elevation than the river.

### Water Works Pays Its Own Way

At Haiwee, a few miles south of Owens Lake, is a basin covering 15 square miles, where a reserve supply of water is kept. On the northern side of the



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on the front has been placed the following inscription: "Johann Wolfgang Goethe was born in this house 28th August, 1749."

### Famous Motto Hangs in Luther House

A short distance from the Goethe house stands a house in which resided for a time a man who left the firm impress of his personality on the German mind. Martin Luther's picture hangs in the house and the inscription marking the place reads, "In quietness and in confidence shall be your strength."

Napoleon defended the city and made it the capital of a grand-duchy, but upon his downfall it regained its independence.

A statue of Schiller stands at the beginning of the Zeil, the principal business street of Frankfort. The city is properly divided into the old and the new sections. The former, which is made up mainly of narrow streets, centers about the Romerberg, or Market-place, from which the Jews were for a long time barred. The fashionable quarter of the city is the West End.

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**THE WAILING PLACE OF THE JEWS: JERUSALEM**

**"May the kingdom soon return to Zion! Comfort those who mourn over Jerusalem. May peace and joy abide with Zion, and the Branch of Jesse spring up at Jerusalem." Thus runs the litany of the Jews, which for centuries has been recited in this place. To-day the never-ending prayers of an exiled people are being answered by the rapidly growing colonies of Jewish people in Palestine and by the dedication of a Hebrew university which will rise near Jerusalem (see Bulletin No. 2).**

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## Manganese: First Lieutenant to Steel

FROM Paris it was recently announced that a United States firm won the concession for the Tchiaturi manganese mines, biggest in the world. Therefore America can shave in the morning with a steady, untroubled hand.

There is an intimate connection between Tchiaturi, deep in an arid ravine under the Caucasus snow peaks, and the cutting edge of the daily razor.

Razors are steel. Steel is iron. But steel also is carbon and silicon and sulphur and phosphorus and manganese, for steel is an alloy just as surely as bronze or aluminum are alloys. Gary and Bethlehem and Pittsburgh can get iron from Minnesota and most of the "seasoning" for their steel in the United States, but they must go abroad for much of their manganese.

### Element Comes From Georgia, Russia

Georgia, not the United States commonwealth, but a state of the Soviet Republic which is federated with Russia, lies along the southern slopes of the giant Caucasus Mountains which cut it off from Russia like the Pyrenees cut off Spain from France. Oil is Georgia's chief mineral resource and manganese is second. Oil at Baku, on the Caspian Sea, did much to build the Transcaucasian railroad from Baku to Batum, on the Black Sea, back in the eighties, but manganese found use for it first.

A few miles west of Tiflis, which is the capital of Georgia, a narrow-gauge branch railroad now winds through the deep cut of the Kvirila River. Its terminal, 25 miles from the main line, is Tchiaturi, which is about 130 miles from the ports of Batum or Poti. Round about Tchiaturi are next to the largest known rich deposits of the rare earth called manganese ore. Although this region is supposed to have 200,000,000 tons awaiting the pick, Brazil is said to have a mountain of it, but this particular Brazilian deposit is so far inland that its exploitation is impracticable at present.

### Supply Baths Dear to Georgian Heart

Before scientists discovered that manganese would facilitate the process of making steel and before they found that a certain per cent made steel wonderfully hard, the Tchiaturi Mountain district was inhabited by a few scattered herders. In prosperous times 4,000 miners now work the hills. A herder of sheep knows little about mining, so at first Italian miners were imported to work the strata. But the mining is easy and comparatively safe, so the Georgians soon caught on and now the great majority of workmen are natives.

Before the World War much was done to maintain good living conditions for the miners. Homes were built for them, together with an institution for hot baths, so dear to the Georgian heart. Electricity came into the mountains for the mines and the villages. Manganese even brought a theater to Tchiaturi.

When the branch railroad reached the deposits there was great rejoicing because previously all ore had to be taken over perilous mountain paths 25 miles to the main line. Seldom more than a ton could be carried by bullock cart at one time. The old Russian government built the branch line, but freight charges were so high, it is said, that they paid the railroad's cost in two years.



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Coast Range near Los Angeles is another reservoir and south of the range are others. The normal flow is 260,000,000 gallons per day, but it fell last year to less than 180,000,000 gallons.

Starting at an elevation of more than 3,000 feet above sea level, the aqueduct water is still 2,500 feet higher than Los Angeles when it reaches the Coast Range. Hydro-electric plants have been established at points within twenty or thirty miles of the city and the water, already valuable in itself, is made to contribute values in power that some day may entirely reimburse the city for its large outlay for the aqueduct project.

**Bulletin No. 3, April 27, 1925.**

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**BRETON WOMEN THRESHING GRAIN WITH JOINTED FLAILS**

**Flails like these were used in the time of Ruth. Perhaps the most impressive feature of rural life in Brittany is the extent to which women and girls perform farm labor. It is the rule to find women and the exception to find men cultivating the fields, harvesting the grains, digging potatoes, stacking hay, threshing the rye or preparing farm products for market (see Bulletin No. 5).**

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## Douarnenez: Port of Fish and Independence

FISHERMEN of Douarnenez, France, have ordered a lockout against the great schools of mackerel off the Breton coast, ruling that boats may bring to port not more than 700 mackerel per man aboard. This has been done, they say, to prevent a collapse in prices. The men of Douarnenez have a habit of taking affairs into their own hands.

Though the Bretons, in the heart of whose homeland so many of the American dough-boys landed when they disembarked at Brest, are peaceful and home-loving, they are very independent. In the fifth century a brother-in-law of Duke Francis II wrote his kinsman: "Monseigneur, I declare to God, I would rather be the ruler of a million of wild boars than of such a people as are your Bretons."

### Haven for Artists, Too

The cursory traveler would not suspect the sleepy little village, whose fishing smacks, with their red and brown sails and blue and brown fish nets, make its waterfront a happy haunt of artists of all nationalities, of being susceptible to emotional outbursts. But the relentless fight which these men must put up against the hungry, dangerous waters of the ocean have given them a lively but melancholy imagination, obstinate determination, and a piety as distinguished as their bravery.

In those early days the little seaside towns, with their counts and other dignitaries, sometimes as important as bishops, like those of Rouen, or even their dukes, like those of Nantes, had more individuality than they boast to-day. But Douarnenez, with about 15,000 people, is one of the most active of the fishing centers along the Breton coast.

Its location is ideal—on a beautiful blue bay nicked out of the westernmost peninsula along the French coast, with a snug little harbor of its own called Port de Rosmeur, behind the mole of which the small sail boats go for shelter. And the Breton men will tell you, "I like my boat better with my sail and my arms for motors."

### Women Cling to "Opera" Costume

About 30,000 religious enthusiasts rub elbows in the Douarnenez streets with artists and natives during the latter part of August of each year, for the last Sunday in the month is the Pardon of Sainte Anne-la-Palud. The various "Pardons" of Brittany—festivals during which indulgences are granted—and the numerous wayside shrines have combined to give this portion of France, which is at the same time both patriotic and alien, the sobriquet of "The Land of Calvaries and Pardons."

In this day of the world-wide use of the plain business suit and standardized dress for American and European women, the customs and costumes of Brittany, like those of the Island of Marken in The Netherlands, give an opera bouffe effect, which the gorgeous sunsets, the wild seas, the rock-bound shores, and the great mountains and plains, dotted with menhirs, only accentuate.

### Legend Embodied in Opera

The intenseness of the people is at once so evident that Lalo immediately saw in its legends the basis for his opera, "Le Roi d'Ys." The story goes that



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## United States Has Some Ore

Up to the time of the World War, Georgia led the world in production of manganese except for the periods of depression in 1907 and 1908. Then its rival, India, passed it. Closing of the Bosporus in 1914 practically sealed the Georgia mines.

The United States has always imported manganese heavily from Brazil, where the mines are in Minas Geraes, about 300 miles northwest from Rio de Janeiro. During the war the United States developed its own manganese resources and is using them to-day to some extent. The principal steel-producing countries have in the past each drawn their chief manganese supplies from a different source; Germany from Georgia, England from India, where it is found in the Presidency of Madras and in Central India, and the United States from Brazil. Montana, the Blue Ridge Mountains of Virginia, Arkansas, Colorado and our own State of Georgia, are the sources within the United States.

Many radio fans also rely on manganese. Grades of ore coming chiefly from Philipsburg, Montana, are important constituents of the dry cell or dry battery.

**Bulletin No. 4, April 27, 1925.**

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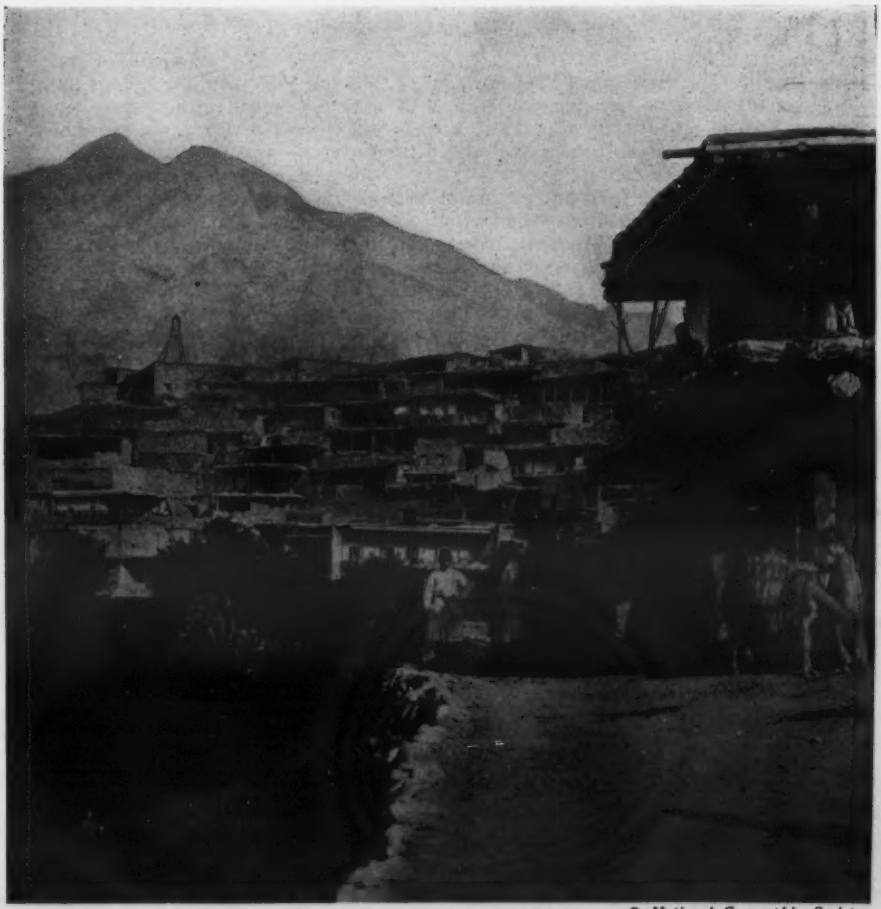
King Gradlon, of the ancient wicked city of Ys, which stood on the shores of the Bay of Douarnenez, had a beautiful daughter who was the wickedest person in the city. The king had been warned by his councilor, St. Corentin of Quimper, but one night while her father slept Dahut stole from around his neck the gold key which unlocked the gates of the dykes and locks of Ys and gave it to one of her lovers. Shortly afterwards torrents of water flooded the city, the king took his daughter on the saddle behind him and fled, but a voice commanded him that she must be left behind. The king alone escaped, the city and all its inhabitants being engulfed beneath the waters of the Bay of Douarnenez.

Douarnenez means literally, the hand of the isle, from the Ile Tristan, just off the coast, named for the valiant Tristan of Leonais, one of the knights of the Round Table. Once the island's interest was religious, but now it is commercial; since the old days its priory has been superseded by a lighthouse and a sardine factory.

**Bulletin No. 5, April 27, 1925.**



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**ENTRANCE TO A VILLAGE IN THE CAUCASUS**

**In some *aouls* or villages, the streets, or passages, from house to house are dark underground corridors, out of which the inhabitants climb into their dwellings on perpendicular ladders or notched logs (see Bulletin No. 4).**

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